Updated 5/3/13

Building a Better Bay Model:

A Workshop for Agriculture Partners

Please select one breakout session per day:

	Wednesday, May 22	Thursday, May 23
Agricultural Modeling	**1. Defining the Landscape**	**1. Measuring the Impacts of Dairy and Beef**
	2. Planting and Harvesting Crops	**2. Accounting for Swine**
	3. Nutrient Placement and Usage	**3. Poultry Production and Nutrients in the Model**
Agricultural Forecasting	**4. Livestock Session, Informing the Present with the Future**	**4. Crop Session, Informing the Present with the Future**

***Agronomic Sessions**
***Livestock Sessions**

Detailed Description of Crop and Animal Production Breakouts

May 22, 2013

Agronomic Sessions

Session 1: Defining the Landscape – Matt Johnston (CBPO modeler); Bob Ensor (facilitator)

Purpose: To make CBP models more accurate in representing agricultural land uses and land use conversions that may affect agricultural non-point source loads; To engage the agricultural community in understanding current agricultural land uses simulated in the model, and to explore potential new opportunities to represent land uses across the agricultural landscape.

As the Model sees it - The Chesapeake Bay Program's Non-Point Source Data Analyst, Matt Johnston, will provide the group with an overview of how Agricultural Census data for crops, animals and farms are used to define the Watershed's agricultural landscape. Johnston will explain how this and other data are used to:

- Place animals, crops and farms on the digital (modeled) landscape;

- Remove agricultural land from production using best management practices such as forest buffers or land retirement;
- Assign basic "loading rates" for nutrients and sediment to each land use;
- And create the conditions for application of nutrients and reductions of nutrients through BMPs.

As the next Model might see it - The Chesapeake Bay Program's Agricultural Technical Coordinator, Mark Dubin, will provide the group with a sneak peak of a set of proposed agricultural land uses for the next version of the Chesapeake Bay Program's Watershed Model, describe how the Agricultural Census and other data might be used to derive these land uses, and describe the process the Bay Program will undertake to assign loading rates to these new land uses.

Discussion questions aimed at improving our landscape definitions:

- What data is available that could help redefine agricultural land uses in the next version of the Model?
- What land use data are other tools currently using that might work well for the Chesapeake Bay Program?
- How do states, producers and others define their agricultural landscapes through the use of land uses?
- What data is available that could help the CBP assign nutrient and sediment "loading rates" to each land use?
- What land use and loading rate data was used in the most recent CEAP study, and how can we learn from the use of this data?
- What regulatory drivers might alter the future agricultural landscape?
- Are there innovative survey approaches that could help define lands under conservation tillage practices, or other common practices that significantly impact sediment and nutrient runoff from the landscape?
- What soil nutrient content data is available across the Watershed? How can the Partnership collect and use county averaged soil nutrient content data?

Session 2: Planting and Harvesting Crops – Gary Shenk (CBPO modeler); Matt Royer (facilitator)

Purpose: To make CBP models more accurate in representing agronomic production systems related to the planting and harvesting of crops that may affect agricultural non-point source loads; To engage the agricultural community in understanding current agricultural production systems simulated in the Model, and to explore potential new opportunities to represent the planting and harvesting of agronomic crops across the agricultural landscape.

As the Model sees it – The Chesapeake Bay Program's Integrated Analysis Coordinator, Gary Shenk, will provide the group with an overview of how data from states, the Agricultural

Census, RUSLE and other sources are used to define how crops interact with nutrients in and runoff across the landscape. Shenk will discuss:

- Placement of crops across the digital (modeled) landscape;
- Detached sediment and crop cover factors;
- Crop inorganic and organic nutrient needs and application rates;
- And crop yields, uptake and nitrogen fixation.

Discussion questions aimed at improving crops in the Model:

- How can the CBP better reflect crop placement and cropping systems across the modeled landscape?
- What data is available that could modify the Model's assumptions for nutrient needs, crop yields and uptake?
- What data is available from the fertilizer industry, state chemistry labs or other sources that could inform the Model about fertilizer use across the watershed?
- How can the Model better reflect both organic and inorganic nutrient use across crop types? E.g., Can we definitively say that a percent of cropland for X crop in Y county does NOT receive manure?
- What data is available that could inform how both organic and inorganic nutrients are transported throughout the watershed from sales or production sites to be used on individual farms?

Session 3: Nutrient Placement and Usage – Jeff Sweeney (CBPO modeler); Erin Ling (facilitator)

Purpose: To make CBP models more accurate in representing agronomic nutrient use and application systems related to the use of both inorganic and organic sources that may affect agricultural non-point source loads; To engage the agricultural community in understanding current nutrient use and application systems simulated in the model, and to explore potential new opportunities to represent the use of these inorganic and organic nutrient sources across the agricultural landscape.

As the Model see it – The Chesapeake Bay Program's Non-Point Source Data Manager, Jeff Sweeney, will provide an overview of how manure nutrients generated by animals or inorganic nutrients are applied to the landscape to meet crop need. Sweeney will discuss:

- How manure nutrients are generated and placed to meet crop need;
- The differences between N and P-based application plans in the current tools;
- What occurs to nutrients that are over-applied in a particular month;
- And how excess nutrients are spread across the landscape in excess of crop need.

The current and future uses of nutrient management in the tools – Chris Brosch, Virginia Tech University and Chair of the Chesapeake Bay Program's Nutrient Management Panel,

will describe how nutrient management is currently simulated in the tools, and options the Panel is considering for improving this simulation.

Discussion questions aimed at improving our understanding of nutrient placement:

- What data is available to describe the number and types of nutrient application management plans, both N-based and P-based, that exist across the Watershed?
- How can the Partnership track and verify P-based nutrient application management plans?
- What data is available that could inform the Model about manure transport into and out of the Watershed beyond state permit data?
- How and when is excess manure applied to a farm with animal production?
- How and when is manure applied to a farm without animal production?

Livestock Session

Session 4: Agricultural Forecasting; Livestock Production – Peter Claggett (CBPO modeler); Jim Baird (facilitator)

Purpose: To make CBP models more accurate in accounting for short and long-term trends that may affect agricultural non-point source loads; To engage the agricultural community in exploring economic, policy, and technological factors influencing future non-point source loads.

As the Model sees it – The Chesapeake Bay Program's Land Data Manager, Peter Claggett, will provide the group with an overview of how land uses are currently forecast using the Chesapeake Bay Land Change Model v2 and how livestock production is extrapolated using statistical techniques. Claggett will discuss:

- Role of short-term and long-term forecasts in the Bay TMDL;
- Data used to represent agricultural land uses;
- Data and methods used to determine rates and quantities of urban development;
- Data and methods used to estimate the amount of farmland converted or retired;
- And assumptions about future manure loads and land use changes.

Q&A - Participants will discuss what's missing from the forecast and what steps could be taken to improve the long-term forecasting capacity of the CBP?

2a. As the next Model might see it - The American Farmland Trust's Mid-Atlantic States Director, Jim Baird, will facilitate a discussion among participants of historic livestock trends, factors influencing those trends, and alternative methods for improving short-term extrapolations of those trends.

2b. Demographic, economic, and environmental factors influencing farm resilience – Peter Claggett will provide an overview of potential "vulnerability" indicators and Jim Baird will facilitate a discussion of factors influencing the persistence of livestock operations.

3. National and Regional-scale Livestock Forecasts and Factors affecting them –A USDA ERS economist and an Agricultural Industry representative will present and lead a discussion. Q&A

4. Future agricultural scenarios – Jim Baird will facilitate a discussion of current regional and industry forecasts to develop a summary of factors/drivers impacting short and long-term livestock trends.

Discussion Questions :

- What data are available to better characterize livestock trends?
- What methods are available to better estimate future livestock production?
- What factors will likely influence historic and future livestock trends?
- What data are available to characterize factors affecting trends?

May 23, 2013

Livestock Sessions

Session 1: Measuring the impacts of Dairy and Beef - Gary Shenk (CBPO modeler); Matt Royer (facilitator)

Purpose: To make CBP models more accurate in representing dairy and beef populations and their associated production systems that may affect agricultural non-point source loads; To engage the agricultural community in understanding current dairy and beef populations and production systems simulated in the model, and to explore potential new opportunities to represent the management of bovines across the agricultural landscape.

As the Model sees it - The Chesapeake Bay Program's Integrated Analysis Coordinator, Gary Shenk, will provide the group with an overview of how the manure nutrients are generated from dairy and beef, and the fate of these nutrients within the tools. Shenk will describe:

- How Agricultural Census data is used to estimate dairy and beef numbers;
- The use of animal production areas in the tools;
- Dairy and beef manure generation, storage and application on pasture and within confined areas;
- And what BMPs can reduce the available nutrients for application to crops.

Discussion questions aimed at improving our understanding of dairy and beef production:

- What data is available from industry or other sources that could improve animal population estimates?
- How much manure is typically generated per animal?
- How is dairy and beef manure typically distributed across the landscape? How far does it travel, and what crops or land areas are most likely to receive it?
- What land uses most appropriately describe the dairy production landscape?
- What BMPs not described in the previous presentation are typically used on dairy operations?
- The model assumes a certain percentage of manure is "lost" to the environment from cattle production facilities, and a nutrient load from this "loss" is transported through the environment. What is this percentage and how was this value developed?
- How is livestock mortality currently represented, and what data is available from industry or other sources that could improve this representation?
- What data sources are available to describe feed management and manure management changes and improvements over time?

Session 2: Accounting for Swine – Jeff Sweeney (CBPO modeler); Erin Ling (facilitator)

Purpose: To make CBP models more accurate in representing swine populations and their associated production systems that may affect agricultural non-point source loads; To engage the agricultural community in understanding current swine populations and production systems simulated in the model, and to explore potential new opportunities to represent the management of swine across the agricultural landscape.

As the Model sees it - The Chesapeake Bay Program's Non-Point Source Data Manager, Jeff Sweeney, will provide an overview of how the manure nutrients are generated from swine and the fate of these nutrients within the tools. Sweeney will describe:

- How Agricultural Census data for are used to estimate swine numbers;
- The use of animal production areas in the tools;
- Swine manure generation, storage and application;
- And what BMPs can reduce the available nutrients for application to crops.

Discussion questions aimed at improving our understanding of swine production:

- What data is available from industry or other sources that could improve animal population estimates?
- How much manure is typically generated per animal type, and what is the typical nutrient content of this manure?
- How is swine manure typically distributed across the landscape? How far does it travel, and what crops are most likely to receive it?
- What BMPs not described in the presentation are typically used on swine operations?
- How often do swine operators clean out their facilities between groups of animals? Do the number of cleanouts differ across states within the Watershed?
- The model assumes a certain percentage of manure is "lost" to the environment from swine production facilities, and a nutrient load from this "loss" is transported through the environment. What is this percentage and how was this value developed?
- How is livestock mortality currently represented, and what data is available from industry or other sources that could improve this representation?
- What data sources are available to describe feed management and manure management changes and improvements over time?

Session 3: Poultry production and nutrients in the Model - Matt Johnston (CBPO modeler); Bob Ensor (facilitator)

Purpose: To make CBP models more accurate in representing poultry populations and their associated production systems that may affect agricultural non-point source loads; To engage the agricultural community in understanding current poultry populations and production systems simulated in the model, and to explore potential new opportunities to represent the management of poultry across the agricultural landscape.

As the Model sees it - The Chesapeake Bay Program's Non-Point Source Data Analyst, Matt Johnston, will provide the group with an overview of how the manure nutrients are generated from poultry and the fate of these nutrients within the tools. Johnston will describe:

- How Agricultural Census data is used to estimate poultry numbers;
- The use of animal production areas in the tools;
- Poultry litter generation, storage and application;
- And what BMPs can reduce the available nutrients for application to crops.

Phytase and other changes – The Chesapeake Bay Program's Agricultural Technical Coordinator, Mark Dubin, will provide the group with an update of work completed by the Chesapeake Bay Program's Poultry Litter Subcommittee. The Subcommittee has gathered thousands of data points from manure sampling labs across the watershed to try to describe how the nutrient content of poultry litter has changed through time.

Discussion questions aimed at improving our understanding of poultry production:

- What data is available from industry or other sources that could improve animal population estimates?
- How much manure or litter is typically generated per animal?
- How is poultry litter typically distributed across the landscape? How far does it travel, and what crops are most likely to receive it?
- What land uses most appropriately describe the poultry production landscape?
- What BMPs not listed are typically used on poultry operations?
- The model assumes a certain percentage of manure is "lost" to the environment from poultry production facilities, and a nutrient load from this "loss" is transported through the environment. What is this percentage and how was this value developed?
- How is livestock mortality currently represented, and what data is available from industry or other sources that could improve this representation?
- How should the model represent the trend to extend whole house cleanouts (sometimes as long as three years) thereby reducing the amount of manure generated?
- What data sources are available to describe feed management and manure management changes and improvements over time?

Agronomic Session

Session 4: Agricultural Forecasting; Crop Production – Peter Claggett (CBPO modeler); Jim Baird (facilitator)

Purpose: To make CBP models more accurate in accounting for short and long-term trends that may affect agricultural non-point source loads; To engage the agricultural community in exploring economic, policy, and technological factors influencing future non-point source loads.

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- Role of short-term and long-term forecasts in the Bay TMDL
- Data used to represent agricultural land uses.
- Data and methods used to determine rates and quantities of urban development.
- Data and methods used to estimate the amount of farmland converted or retired.
- Assumptions about future manure loads and land use changes.

Q&A - Participants will discuss what's missing from the forecast and what steps could be taken to improve the long-term forecasting capacity of the CBP?

2a. As the next Model might see it - The American Farmland Trust's Mid-Atlantic States Director, Jim Baird, will facilitate a discussion among participants of historic crop production trends, factors influencing those trends, and methods for developing short-term extrapolations of those trends.

2b. Demographic , economic, and environmental factors influencing farm resilience – Peter Claggett will provide an overview of potential "vulnerability" indicators and Jim Baird will facilitate a discussion of factors influencing the persistence of cropping operations.

3. National and Regional-scale factors affecting Crop Production trends –USDA ERS economist will present and lead a discussion.

4. Future agricultural scenarios – Jim Baird will facilitate a discussion of current regional and industry forecasts to develop a summary of factors/drivers impacting short and long-term crop production and cropland area trends.

Discussion Questions:

- What data are available to better characterize crop trends?
- What methods are available to better estimate future crop production?
- What factors will likely influence historic and future crop trends?
- What data are available to characterize factors affecting trends?